

SECTION 402 BITUMINOUS MATERIALS

402.01 DESCRIPTION. This work is the furnishing and applying bituminous materials, on bases and surfacing.

402.02 MATERIALS. Furnish bituminous materials meeting Section 702 and the Contract requirements.

402.03 CONSTRUCTION REQUIREMENTS. Mix and apply bituminous material meeting the applicable requirements in Sections 401, 404, 406, 407, 409, and 410.

402.03.1 Materials Source. Obtain the Engineer's approval of the bituminous source before delivering the material to the project. Do not change the source of supply once work is started, without the Engineer's written approval.

402.03.2 Sampling.

A. General. Take bitumen samples, other than products accepted under quality assurance, at the point of delivery on the project.

The Contractor or designated representative is responsible for sampling the bituminous materials on the project using MT-302.

Drain off and discard at least 1 gallon (3.8 L) of the bituminous material before drawing samples.

Draw 2 one-quart (0.9 L) samples from each shipment, witnessed by the Project Manager. Forward one sample for testing and retain the second sample for use as specified in Section 702.02.

Equip all transport vehicles with a spigot or gate valve in the unloading line, or in the tanker at the centerline of the tank, or in the pressure line from the unloading pump, or at another approved location. The spigot or gate valve diameter must be between 3/8-inch (9.5 mm) and 3/4-inch (19 mm). Locate the spigot or valve to prevent plant dust or other sample contamination.

B. Asphalt Sampling (Quality Assurance Sampling). Sample asphalt cement for plant mix surfacing and base, plant mix seal course, and open-graded friction course using a sampling device located in the line between the storage facilities and the mixing plant.

Provide a sample of the asphalt cement entering the mixing plant. One approved in-line sampling device is shown in ASTM D 140.

Place the samples in department furnished containers. Give the samples to the Project Manager immediately after sampling.

The Project Manager will randomly designate the time of sampling based on the tons (metric tons) of completed mix produced. The approximate quantity of mix represented by each sample will be 500 tons (450 mt). The Project Manager may require additional samples and testing.

Six samples will represent approximately 3000 tons (2700 mt) of mix and constitute a lot whenever production schedules or material continuity permit. The Project Manager may establish a lot consisting of the quantity represented by any number of consecutive random samples, from three to

six inclusive, when it is necessary to represent short production runs, significant material changes, or other unusual characteristics of the work.

402.03.3 Shipping. Ship the bituminous material in clean, uncontaminated, fully insulated cars or trucks, sealed by the supplier after loading.

402.03.4 Testing. Bituminous materials are accepted on the test results of samples selected and tested under Subsection 702.02 by the Department or its authorized representative.

402.03.5 Acceptance.

A. General. Provide the Project Manager a copy of the original bill of lading and a copy of the certificate of compliance, with each shipment. Assure the certificate is signed by the supplier's representative and attests that the bituminous material meets the Department's specifications for the type and grade of material provided and that the shipping container was inspected and found free of contamination. The certificate of compliance is the basis for tentative material acceptance and use.

B. Asphalt Cement Penetration (Quality Assurance). Asphalt cement for bituminous plant mix surfacing and base, open-graded friction course, and plant mix seal course is tested for penetration on a lot-by-lot basis. Acceptance is by Subsection 105.03.2. Asphalt cement with an anti-stripping additive is not evaluated under this provision.

The asphalt cement quantity in a lot, used for calculating the amount of price reduction, is based on the job mix target value of asphalt for that lot and the total tons (metric tons) of completed mix in the lot.

C. Failures Other Than Asphalt Cement Penetration (Non-Quality Assurance). If a shipment of bituminous material fails to meet any of the specifications, other than penetration, after the tolerances in Subsection 702.02 are applied, the material may be accepted at a 10% price reduction of the bituminous material cost.

If a shipment fails to meet any one of the specifications after twice the allowable tolerances have been applied, the price reduction will be 25 percent of the bituminous material cost.

If a shipment fails to meet any one of the specifications after triple the allowable tolerances have been applied, the Engineer may reject the material and require its removal from the work, or the Engineer may accept the material at a 50 percent price reduction of the cost of the bituminous material.

The cost of the bituminous material for calculating price reductions is the material's contract unit price.

If a shipment fails more than one of the specifications, the failure causing the largest percentage price reduction is assessed.

402.03.6 Loading and Application Temperatures. The Project Manager will designate the recommended application temperature ranges using Table 402-1.

Do not heat bituminous mix any higher than is necessary for proper hauling and placing.

Do not introduce aggregate into a mixer higher than 25 °F (14 °C) above the bituminous material temperature.

Furnish the Project Manager with data on the temperature-viscosity relationship of each asphalt to be used on the project. The data must cover the recommended temperature range and viscosities at which the asphalt may be used. The Project Manager will use this data to specify the temperature at which the material will be used.

**TABLE 402-1
RECOMMENDED APPLICATION TEMPERATURES
FOR BITUMINOUS MATERIALS - DEGREES F**

LIQUID ASPHALTS - RC, MC and SC

Grade	Loading Temp. Max.* °F °C		Spraying Temp.	Mixing Temp. of Aggregates for MC & SC Liquid Asphalts			
				Min. °F °C		Max. °F °C	
70	195	91	**As required to Achieve viscosity of 50- 200 centistokes (25- 100 Sec. Saybolt Furol)	90	32	155	68
250	245	118		125	52	200	93
800	275	135		160	71	225	107
3000	310	154		200	93	260	127

*Line Temperatures

**See Temperature - Viscosity Charts (MT-308)

EMULSIFIED ASPHALTS

Grade	Mixing Temperature		Spraying Temperature			
	Min. °F °C	Max. °F °C	Min. °F °C	Max. °F °C	Min. °F °C	Max. °F °C
Slow and Medium Setting	50 10	130 54	50 10	130 54	50 10	130 54
Rapid Setting	—	—	120 49	160 71	120 49	160 71

ASPHALT CEMENTS

Grade	Mixing Temperature	Spraying Temperature
All Penetration Grades	Established by Project Manager	350° F Max. (177 °C)

402.03.7 Alternate Type or Grade of Bituminous Materials. The Engineer may change or substitute, in writing, the type and grade of bituminous material specified.

Payment for the changed or substituted bituminous material is the contract unit price for the type and grade of bituminous material plus or minus the difference in

Contractor's cost at the refinery between the specified and substitute type and grade.

The Engineer may change the grade of bituminous material one step at no change in price.

402.04 METHOD OF MEASUREMENT. Bituminous material is measured by the U.S. gallon (liter) or the ton (metric ton), as specified in the Contract.

If measured by the gallon (liter), the volume of bituminous material is determined at a temperature of 60 °F (15.6 °C) or corrected to this using the appropriate group table designated in the ASTM D 1250 volume correction tables. Transport bituminous materials measured by the gallon (liter) in tanks certified as to capacity. Provide a measuring rod and calibration card with each tank. Railroad tank cars must have available inage and outage tables and dome capacity charts.

When measured by the ton (metric ton), the bituminous material weight is measured on scales furnished by the supplier or on public scales close to the source. Weigh each transporting vehicle for bituminous materials, other than railroad tank cars, empty and loaded. The weight difference is used for computing the tonnage (metric tonnage). Furnish an approved scale that can weigh the transporting unit in an unbroken operation. Test and seal the scales at Contractor expense when directed.

For plant mix operations, the bituminous material may be weighed by the plant scales, if approved.

If railroad tank cars transport the bituminous materials, the railroad car weights may be used for computing the weight of bituminous material, if the loaded cars are weighed over track scales. The stenciled tare on the car used for determining the net weight is subject to verification.

Flow rate meters under Subsection 401.03.2(D)(7), will be used to measure the material. Document meter readings by invoices. The Project Manager may take tank stabs for verification purposes.

402.05 BASIS OF PAYMENT. Payment for the completed and accepted quantities is made under the following:

Pay Item

Bituminous Material

Pay Unit

Gallon (liter) or Ton (metric ton)

Payment includes all costs to furnish, deliver, heat, haul, and apply the bituminous material.

For plant mix operations, the maximum volume of bituminous material eligible for payment on a shift basis is the target bituminous content plus 0.3%.

Payment at the contract unit price is full compensation for all necessary resources to complete the item of work under the Contract